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See what's new at AOOS this Spring!

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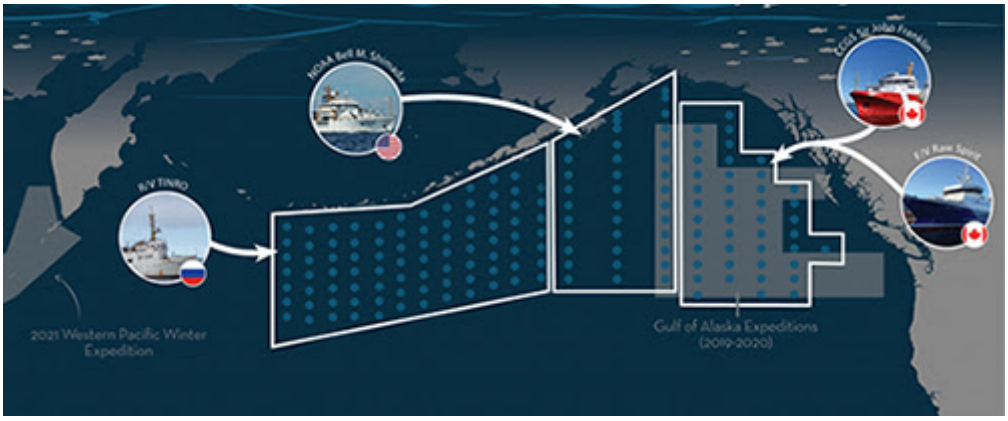
AOOS Alaska Ocean Observing System

SPRING 2022 E-NEWS

International Year of the Salmon

The International Year of the Salmon five-year initiative includes several research cruises collecting data on the ecology of Pacific salmon.

IYS: Salmon Survey



By Sabrina Garcia, ADF&G

Sabrina Garcia is a marine biologist with the Alaska Department of Fish and Game who participated on the AOOS supported International Year of the Salmon survey. She primarily studies the lives of salmon and sharks in Alaskan waters.

I recently participated in a research survey to study Pacific salmon in the winter as part of the International Year of the Salmon (IYS) initiative. For this multi-national expedition, four vessels set out to fish for salmon across the North Pacific Ocean. I was onboard the Bell M Shimada with a dozen other scientists from Alaska and the Pacific Northwest. Our vessel was outfitted with specialized equipment to study salmon and their environment.

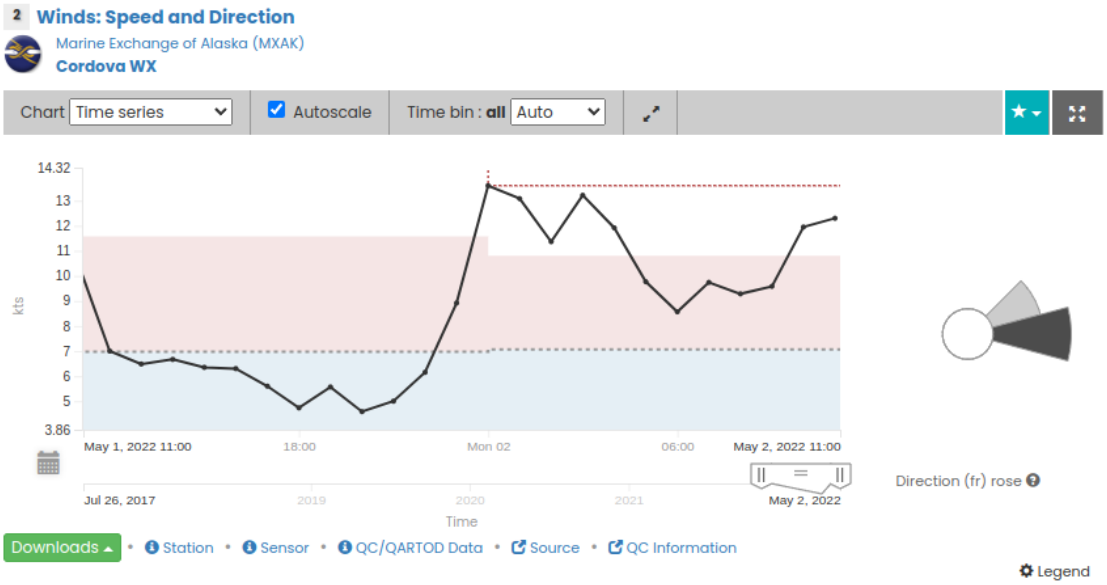
After each trawl, the catch was sorted by species, weighed, and measured. We also collected many samples from the salmon we caught: a blood sample to measure hormone levels, scales to estimate age and growth, a piece of tissue for genetic analysis to determine where the salmon was from, stomach contents to see what they were eating, and muscle samples to measure their energy reserves. The information collected from all these samples will help us understand what may be affecting salmon survival in the ocean. Though we encountered all five species of salmon during our survey, we mostly caught chum and sockeye salmon. On the second to last day of operations we caught and satellite-tagged a 6.5 ft salmon shark, so we can track her locations via satellite for the next three years. The best part of the survey was working with and learning from research scientists within and outside of Alaska. Our hope is that the data collected during this survey will help shed some light on the life of salmon in the ocean. Read more about the IYS High Seas Expeditions

IYS: Glider Mission

The Alaska Ocean Observing System (AOOS) glider team from the University of Alaska Fairbanks along with partners from the University of Washington and NOAA recently completed a two-month glider deployment in the Northern Gulf of Alaska as part of the 2022 International Year of the Salmon Pan-Pacific Winter High Seas Expedition to study salmon in their winter habitat. The glider is equipped with standard physical (temperature, salinity) and biogeochemical optical sensors (chlorophyll fluorescence, dissolved oxygen, optical backscatter), and was re-engineered to include advanced bioacoustic sensing capabilities. An upward looking acoustic transducer is used to estimate fish and plankton density and abundance. Data volume and satellite bandwidth constraints limit transmissions from acoustic instruments on gliders. A new sophisticated onboard data processing computer and custom software reduces and statistically summarizes the high-volume backscatter data, thereby resolving satellite transmit bandwidth limitations. The

glider sends near-real time information to the AOOS data portal, where glider transects and profiles of water column variables like temperature and salinity can be viewed, and where a developing EcoMetrics Dashboard user interface can be accessed. The dashboard reports a suite of key environmental indices that allow scientists and fishery resource managers to efficiently assess ecosystem status while setting seasonal fishing quotas. Support for these glider upgrades and activities came from the NOAA Office of Ocean Exploration and Research, the NOAA Uncrewed Systems Operations Center within the Office of Marine and Aviation Operations (OMAO) and AOOS, the Alaska Regional Association for the NOAA IOOS Program.

Photo: *The glider ready to be launched in the Northern Gulf of Alaska. Photo Credit - Hank Statscewich, UAF*



Real Time Information for Maritime Conditions

The AOOS Ocean Data Explorer portal was developed with the initial goal of providing real time marine data in one location for ease of use. We now have the largest collection of real time data available for the Alaska region. Pre-made data views for real time information on maritime conditions are presented on the AOOS website for several coastal communities in Alaska. These

data views display real-time ocean and weather conditions for the past 24 hours near various coastal communities in Alaska. The data view for Ketchikan, for example, includes a view of the area observed by an FAA webcam; wind speed and direction measured by the Marine Exchange of Alaska; air temperature measured by the Marine Exchange of Alaska; water levels measured at the Ketchikan NOAA CO-OPS Station; and high and low tide predictions at the Ketchikan NOAA CO-OPS Station. Pre-made data views for real time information on maritime conditions have been created for Anchorage, Cordova, Dutch Harbor, Homer, Juneau, Ketchikan, Kodiak, Nome, Seward, Sitka, Valdez, and Whittier.

Ocean Acidification Network Update

This spring the Alaska Ocean Acidification Network is hosting a 4 part discussion series March - May. The objective is to explore topics within ocean acidification that are of most interest to Alaskans and provide a space to both learn and provide input. Sessions will focus on regional conditions, OA impacts on mariculture and subsistence, OA impacts on commercial species, and adaptation & mitigation. You can view recorded presentations or register for the next session. April has also been an opportunity to educate the Alaska Legislature. Network director Darcy Dugan met with coastal legislators in Juneau to expand education on OA and discuss funding an appropriation for next year. She and a panel of researchers also briefed the House Fisheries Committee this week. Looking for recent science? Check out the new brochures on OA and salmon and OA and Bering Sea Crab produced in partnership with researchers and fishing industry partners. Coming soon: a new OA Network website!

New Harmful Algal Bloom Research

Two recent research efforts from partners of the Alaska Harmful Algal Bloom (AHAB) Network highlight the potential for HABs in the Arctic and the importance of continued research and monitoring. Together, these two studies show the potential threat of HABs in the Alaskan Arctic, especially under expected ocean conditions in the future. Research efforts such as these, along with monitoring programs for harmful phytoplankton and toxins, are crucial to better understanding HABs and mitigating their impacts.

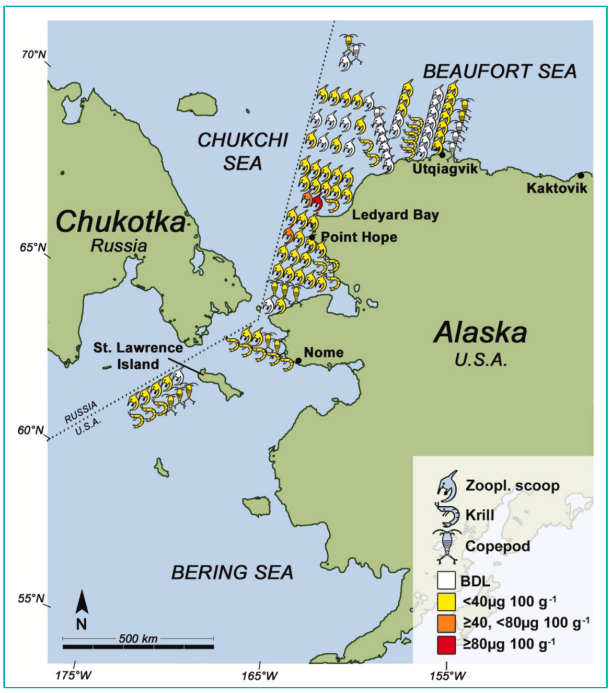
A team of researchers led by Dr. Don Anderson at the Woods Hole Oceanographic Institute found that the sediment in the Chukchi and Beaufort seas contains some of the highest densities of Alexandrium cysts anywhere in the world (see the full study here). These Alexandrium cyst beds have the potential to seed recurrent HAB events that could threaten human and ecosystem health as well as food security in the region.

Dr. Kathi Lefebvre of the Northwest Fisheries Science Center led another study that analyzed ecosystem components for paralytic shellfish toxins (PSTs) – the toxins produced by Alexandrium – during 2019 when water temperatures were unusually warm (see the full study here). Samples of zooplankton, invertebrates, fish, and marine mammals all showed detectable levels of PSTs,

with clams showing high levels particularly around the areas of high Alexandrium cyst concentration (see map).

To learn more about the work being done on HABs in Alaska, visit the Alaska Harmful Algal Bloom network website.

Map caption: *Map of PST concentrations in clams and worms, color coded by the toxin level. Figure from Lefebvre et al. (2022).*



BACKYARD BUOYS

Bringing Wave Buoys to Indigenous Communities

Indigenous communities have relied on the ocean for millennia and still do to this day. Climate change, however, is making the ocean unpredictable, and poses a new and urgent challenge. Rising temperatures and sea levels threaten coastal communities and whalers or fishers ask "Is today a safe day to take my boat out?" They simply do not have the wave data necessary to complement their Indigenous Knowledge and make an informed decision.

In order to provide Indigenous communities with wave data, collaboration and funding is paramount. As part of a community-led ocean observing project funded by the National Science Foundation (NSF) Convergence Accelerator program, AOOS is partnering with two other regional associations (PacIOOS in Hawai'i and the U.S. Pacific Islands and NANOOS in the Pacific northwest U.S.), a technology partner (Sofar Ocean), and Indigenous partners from the Pacific Islands, Pacific Northwest, and the Alaska Eskimo Whaling Commission (AEWC) to launch Backyard Buoys.

The goal of Backyard Buoys is to empower Indigenous and other coastal communities to collect and use ocean data to support maritime activities, food security, and coastal hazard protection.

Central to this effort is Sofar's affordable Spotter wave buoys which, once deployed, will provide accessible and actionable ocean data that bridges to Indigenous knowledge via a web-based application. Throughout the project, a sustainable and community-led stewardship program will oversee management of the buoys.

“Our whaling communities are located along the Arctic coast of Alaska and rely on the resources from the sea to feed our communities. The sea can be very unforgiving and dangerous. And it changes all the time. This technology will allow us to improve safety for our hunters and better understand environmental changes to assist in our subsistence activities. Our communities are excited to utilize the buoys and we believe that over time, once more data is collected, we can utilize the information for multiple purposes,” said AEWC Vice Chair Crawford Patkotak.

The National Academies of SCIENCES ENGINEERING MEDICINE | OCEAN DECADE U.S. U.S. National Committee for the Decade of Ocean Science for Sustainable Development | 2021 2030 United Nations Decade of Ocean Science for Sustainable Development

United Nations Decade of Ocean Science: Arctic Action Plan

Activities are underway to develop an Arctic Regional Program as part of the UN Decade of Ocean Science. AOOS Senior Advisor Molly McCammon helped organize a recent community workshop as part of the Arctic Science Summit Week to further scope a potential program, and how it could be used to leverage the Arctic Action Plan (2021 Arctic Action Plan) as well as existing activities, including AOOS and the US Arctic Observing Network. The Marine Working Group of the International Arctic Science Committee voted to take the lead in helping to facilitate the next steps, which will include a workshop sometime in summer or fall. For more information contact Molly at mccammon@aoos.org.

Don Young and AOOS

By Molly McCammon, AOOS Senior Advisor

From AOOS’ inception in 2004, Congressman Don Young of Alaska was a friend and strong advocate of AOOS, its parent program the national Integrated Ocean Observing System housed within NOAA, and ocean research and monitoring in general. His door was always open -- to myself, and to AOOS and IOOS board members -- to learn about our latest programs and technological advancements.

Congressman Young strongly believed that ocean observations in Alaska’s coast and nearshore waters were essential for keeping Alaska’s fisheries, aquaculture programs, and coastal communities strong and healthy. He knew that increased understanding of ocean conditions could help Alaskans better respond to the impacts of warming ocean temperatures, ocean acidification and harmful algal blooms.

The Congressman was a leading voice in Congress for IOOS. He led the reauthorization of the 2020 Integrated Coastal Ocean Observing System Act, which codified in federal statute the national program, and its 11 regional components. Each year, he championed funding for regional IOOS, so instrumental in ensuring funding for AOOS.

AOOS will miss this Alaska friend.

Photo: *Congressman Don Young eagerly samples Pacific oysters that were provided as part of an IOOS-sponsored briefing on the benefits of IOOS observations to shellfish farmers. Photo credit: Molly McCammon*

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About AOOS

The mission of AOOS is to address regional and national needs for ocean information, gather specific data on key coastal and ocean variables, and ensure timely and sustained dissemination and availability of these data.

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